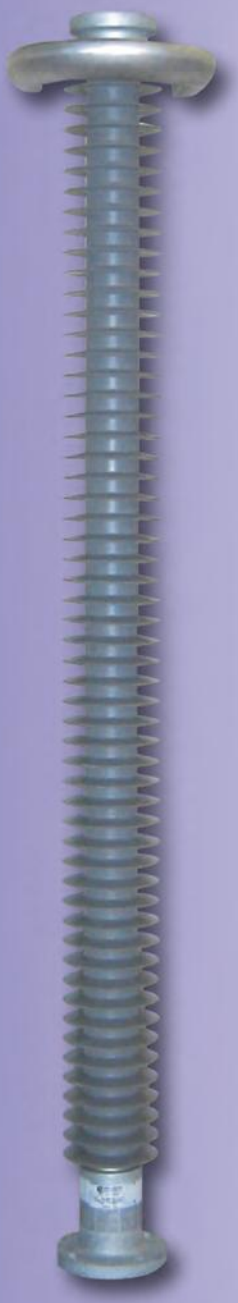

CATALOG **233**

Polymer Station Post Insulators for 69 to 345 kV Applications

NGK-LOCKE, INC.

Virginia Beach, Virginia, U.S.A.

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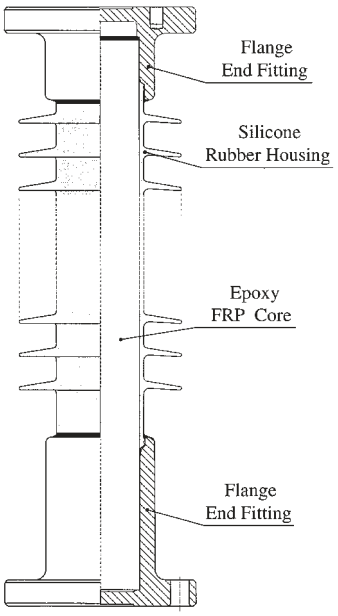
NGK-LOCKE management systems comply with the requirements of ISO9001:2008 (Certificate #FM36580, since 1997) and ISO 14001:2004 (Certificate #EMS96014,since 2005); the registrar for both certificates is BSI Group America Inc., based in Reston, Virginia.

Polymer Station Post Insulators

NGK-LOCKE provides polymer station post (SP) insulators that are manufactured using the same unsurpassed designs, materials, and quality control used in our polymer suspension & line post insulators. Our end fitting sealing system employs **double O-rings plus an RTV sealant** that have demonstrated excellent protection against moisture penetration.

The housing material is **silicone** rubber, which provides excellent contamination performance. This housing is formed by compression molding silicone rubber onto the core as one continuous part free of any joints. Both housing and core are **chemically bonded** together during the vulcanization process. The strength of this bond is greater than the tearing strength of the silicone housing material tself. End fittings are then assembled by a **pressure controlled, multi-step, crimping process**. Overall length and hole alignment are controlled by NGK-LOCKE’s unique design and manufacturing process.



Polymer SP Structure

This process provides the SP with more severe tolerances required for substation equipment. As shown below, NGK-LOCKE polymer station post insulators have excellent seismic performance due to their flexibility. NGK-LOCKE produces polymer SP with a 2.5” and a 3.5” diameter solid core.

230kV, 3.5” SP (Bus Support)

Seismic Test on 230kV, 3.5” SP in accordance with IEEE 693

69kV, 3.5” SP

Application Guidelines for Polymer Station Posts (SP)

- NGK-LOCKE’s SP complies with dimensional and electrical values in accordance with ANSI C29.9 Technical Reference (TR) Number. The cantilever and tension strengths exceed the required values of the ANSI standard. Compression and torsion strengths are given as guaranteed values.
- Specified Cantilever Load (SCL) is breaking load guaranteed by manufacturer and should be less than Cantilever Breaking Load (CBL), which is the maximum load reached during a cantilever breaking test.
- The deflection values shown in this catalog correspond to the deflections measured at the relevant ANSI TR porcelain’s Maximum Working Load (MWL is specified as 40% of the ANSI TR porcelain’s cantilever strength).
- SP for underhung applications are also available. Contact your NGK representative for more information.

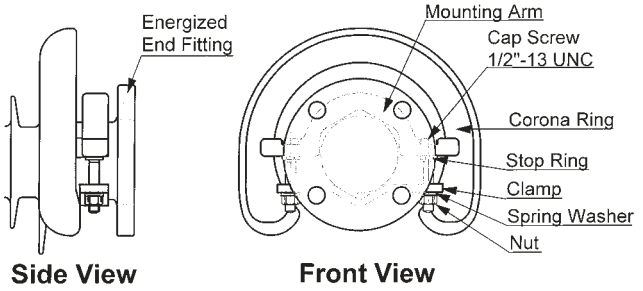
CATALOG NUMBER SYSTEM

S 2 – S N 4 7 1 – 2 2 – W

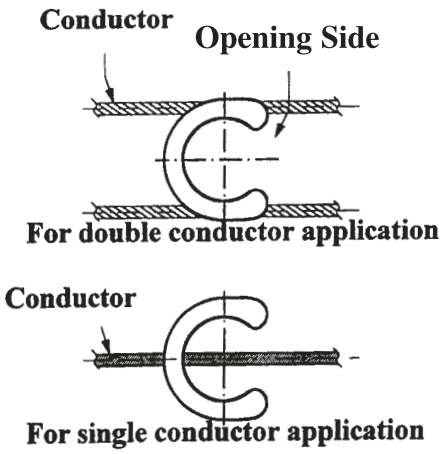
- **S** — Type of Insulator S: Station Post
- **2** — Core Dia. 2: 2.5” 4: 3.5”
- **SN** — Shed Shape N: Standard Leakage G: Bigger Sheds on Both Ends for 2.5” SP H: Bigger Sheds on Both Ends for 3.5” SP
- **471** — Number of Sheds
- **1** — Design Variation
- **22** — Top Flange Base / Bottom Flange Base
- **W** — Grading Ring Application None: BIL750kV & below W: 11” ring for 2.5” SP X: 15” ring for 3.5” SP

Corona Ring Application

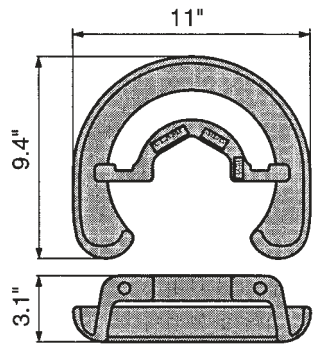
Ring Mounting Detail



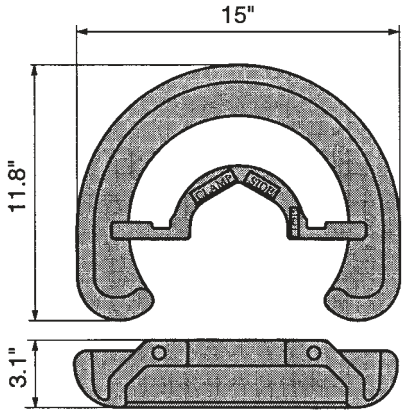
Recommended Mounting Direction



“W” Grading Ring



“X” Grading Ring



Standard Strength Station Post Application with 2.5” Core

TR*1	NGK Catalog #	BIL and Impulse Withstand, kV	Height, inch	Leakage distance, inch	Cantilever SCL*2, K lbs.	Compression*3, K lbs.	Deflection, at TR’s MWL*4		Critical Impulse Pos., kV	Power-Frequency Wet Withstand, kV	Max. RIV, μV/kV	Approx. Weight lbs.
							TR’s MWL, K lbs.	inch				
278	S2-SG191-21	350	30	78.9	4.5	25.0	1.20	0.8	390	145	200/44	35
286	S2-SG311-21	550	45	128	2.8	12.0	0.68	1.8	610	230	200/73	45
287							1.04	2.7				
288	S2-SN311-21	650	54	129	2.3	8.0	0.56	2.5	710	275	200/88	47
289							0.88	3.9				
291	S2-SN361-21	750	62	150	2.0	6.0	0.48	3.3	810	315	500/103	51
295							0.74	5				
304	S2-SN471-22-W	900	80	196	2.0	3.5	0.38	5.5	1010	385	500/146	67
308							0.58	8.4				
312	S2-SN551-22-W	1050	92	229	1.8	2.5	0.32	6.7	1210	455	500/146	74
316							0.50	10.5				

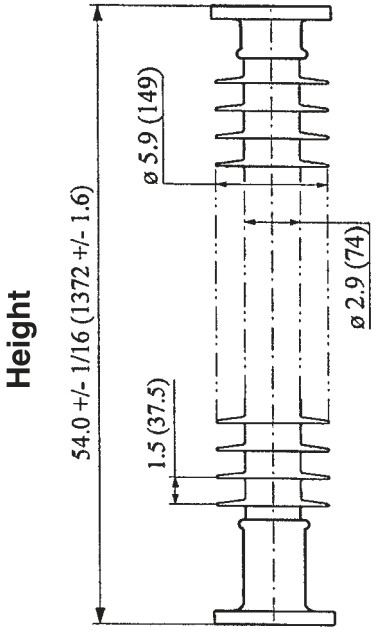
*1: ANSI Technical Reference Number

*2: Specified Cantilever Load was determined using high strength bolts.
Depending on the grade of bolt, a bolt failure may occur before core failure.

*3: Compression values are based on testing per the procedure specified in ANSI C29.9-1983 using fixed ends.
Actual application conditions may result in different compression strength values.

*4: Deflection measured at the relevant ANSI C29.9-1983 TR porcelain’s maximum working load.

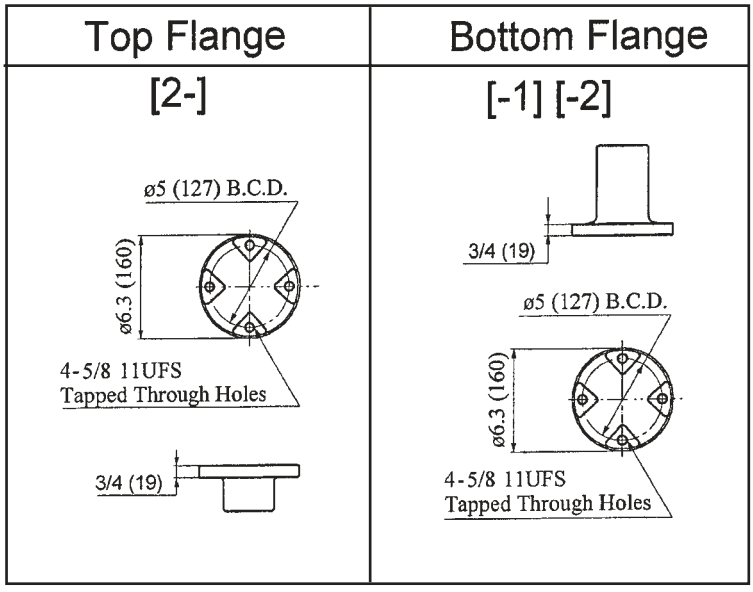
Tensile Strength: 25K lbs.
Torsion Strength: 30K in-lbs.



S2-SN311-21

The dimensions are in inches.
The metric equivalents (millimeters) are shown in ( ).

Flange End Fitting Detail

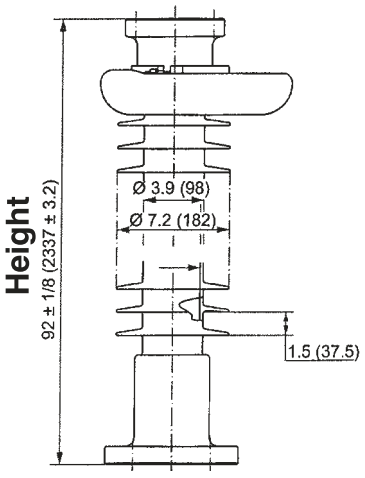


High Strength Station Post Application with 3.5” Core

TR*1	NGK Catalog #	BIL and Impulse Withstand, kV	Height, inch	BCD, inch	Leakage distance, inch	Cantilever SCL*3, K lbs.	Compression*4, K lbs.	Deflection, at TR’s MWL*5		Critical Impulse Pos., kV	Power-Frequency Wet Withstand, kV	Max. RIV, μV/kV	Approx. Weight lbs.
								TR’s MWL, K lbs.	inch				
278	S4-SH151-22	350	30	5	72.9	8.0	45.0	1.20	0.3	390	145	200/44	54
286	S4-SH251-22	550	45	5	117	5.0	45.0	0.68	0.5	610	230	200/73	70
287								1.04	0.8				
288	S4-SN311-22	650	54	5	137	4.1	35.0	0.56	0.8	710	275	200/88	78
289								0.88	1.2				
291	S4-SN361-22	750	62	5	160	3.6	26.0	0.48	1.1	810	315	500/103	86
295								0.74	1.6				
304	S4-SN461-11-X	900	80	5, 7*2	204	4.5	16.0	0.38	1.6	1010	385	500/146	128
308								0.58	2.4				
312	S4-SN541-11-X	1050	92	5, 7*2	240	3.9	11.0	0.32	1.9	1210	455	500/146	141
316								0.50	3.0				
324	S4-SN641-13-X	1300	106	5	285	2.3	8.2	0.40	4.0	1410	525	1000/220	156
367*6								0.58	5.7				
369*6								0.82	8.1				
330	S4-SN741-11-X	1470	122	5, 7*2	329	2.9	6.2	0.36	5.3	1610	590	1000/220	174
371								0.47	6.9				
373								0.70	10.3				

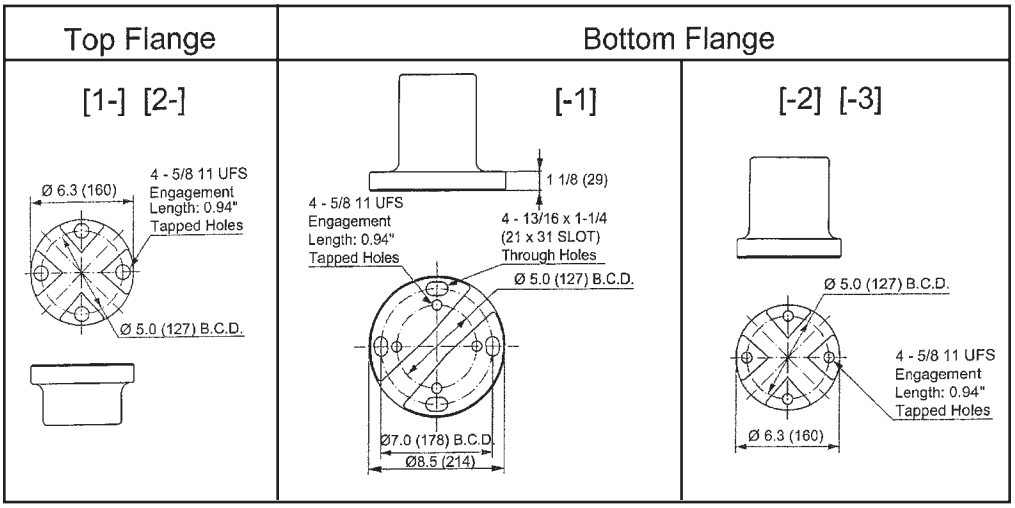
*1: ANSI Technical Reference Number
*2: The mechanical load was determined using a 7-inch BCD mounted specimen.
Care should be taken when a specimen is mounted using 5-inch BCD.
*3: Specified Cantilever Load was determined using high strength bolts.
Depending on the grade of bolt, a bolt failure may occur before core failure.
*4: Compression values are based on testing per the procedure specified in ANSI C29.9-1983 using fixed ends.
Actual application conditions may result in different compression strength values.
*5: Deflection measured at the relevant ANSI C29.9-1983 TR porcelain’s maximum working load.
*6: BCD at bottom flange is 5 inch though the porcelain’s TR specifies 7 inch BCD.

Tensile Strength: 25K lbs.
Torsion Strength: 55K in-lbs.



S4-SN541-11-X

Flange End Fitting Detail



The dimensions are in inches.
The metric equivalents (millimeters) are shown in ( ).

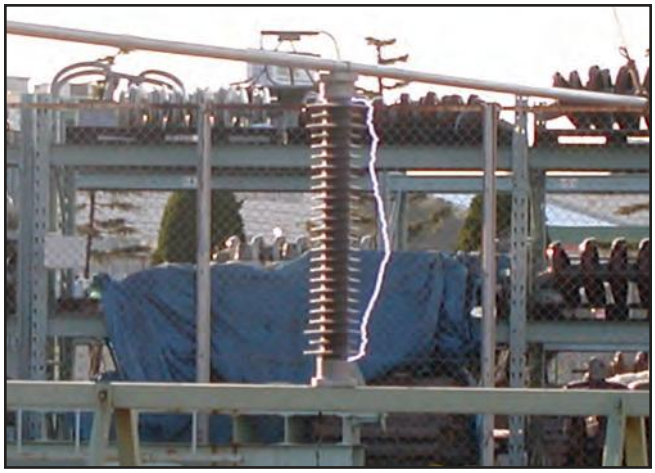
Research & Development

The station post insulators were subjected to various mechanical, electrical, and aging tests to validate the design. Some tests and the facilites are introduced in the following.

Cantilever Strength Test

Torsion Strength Test

Compression Strength Test



Critical Impulse Flashover Test

Low-Frequency Wet Withstand Test

Packaging

All of NGK-LOCKE's insulators are packed in weatherproof containers in order to protect the products during land, air, and sea transportation. Several different grades of packaging can be offered depending on the mode of transport and the expected storage conditions. The packaging options that we offer are 1) standard grade/ prefabricated packing, 2) economical grade/cardboard carton, and 3) best grade/closed wooden crate.
Since the user best knows their crate requirements, they should select the option that is most suited to their needs and include that information in the purchasing specification. Special packaging arrangements can be accommodated upon request.
Each container is marked with the number of insulators it contains, the catalog number, the manufacturer's name, and any other customer requests. Also, a "Polymer Station Post Insulator Handling Instruction" sheet is included with all containers. This sheet states any necessary cautions during handling, transportation, and installation. If corona rings are to be included, a corona ring installation sheet is also provided.

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